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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/069,533	03/06/2002	Jean-Pierre Huignard	220164US2PCT	4579

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ALEXANDRIA, VA 22314

EXAMINER

AL NAZER, LEITH A

ART UNIT	PAPER NUMBER
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2828

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/069,533

Applicant(s)

HUIGNARD ET AL.

Examiner

Leith A Al-Nazer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 9-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7,8 and 12-16 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

2. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not teach or suggest the structural limitations found in dependent claim 6. Specifically, the prior art of record does not teach a beam splitter configured to transmit part of the monomode laser beam toward the multimode doped fiber and a reflected part of the monomode laser beam toward the holographic mode conversion device.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

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1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 1, 4-8, 12-14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waarts et al '271 in view of Hill et al '707, Szczepanek '298, or Cunningham et al '010.

With respect to claims 1 and 12, Waarts teaches a pumped fiber laser comprising a multimode doped fiber (23; column 10, lines 38-60) having a first end and a second end; spatial mode conversion means (15 and 37 in figure 2; column 9, lines 37-60; column 12, lines 26-44) configured to receive light from the multimode doped fiber; and a monomode laser oscillator (11 and 21 in figure 2) configured to transmit a monomode laser beam to the first end of the multimode doped fiber. Claim 1 requires the spatial mode conversion device be a holographic spatial mode conversion device. Hill (column 4, lines 22-26), Szczepanek (column 5, lines 22-30), and Cunningham (column 1, lines 20-42) all teach the utilization of a holographic spatial mode conversion device. It is well known to one having ordinary skill in the art that one spatial mode conversion device can be substituted for another spatial mode conversion device.

Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to substitute the spatial mode conversion device of Waarts with the holographic spatial mode conversion device of Hill, Szczepanek, or Cunningham. The motivation for substituting one spatial mode conversion device for another would be to obtain desired properties, such as quick-tuning with real-time holographic effects, as is discussed in Cunningham (column 1, lines 36-42).

With respect to claim 4, Waarts teaches a phase conjugation device coupled to the second end of the multimode doped fiber and configured to reflect the monomode laser beam (column 12, lines 31-44).

With respect to claims 5 and 7, Waarts teaches at least one pumping light source (25) configured to transmit a corresponding at least one pumping beam to the multimode fiber.

With respect to claim 8, Waarts teaches the multimode fiber comprising a plurality of doped cores (column 10, lines 46-60).

With respect to claim 13, Waarts teaches an optical cavity configured to contain the pumped-fiber laser such that the spatial mode conversion means (15) is arranged in series with the optical cavity (figure 2).

With respect to claims 14 and 16, Waarts teaches a laser device comprising an optical cavity; a pumped-fiber laser (23) contained within the optical cavity; and a spatial mode conversion means (15) in series with the optical cavity, the spatial mode conversion means configured to convert a multimode beam into a monomode beam.

6. Claims 1, 2, 5-8, and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fermann et al '630 in view of Hill et al '707, Szczepanek '298, or Cunningham et al '010.

With respect to claims 1 and 12, Fermann teaches a pumped fiber laser comprising a multimode doped fiber (12) having a first end and a second end; spatial mode conversion means (50; column 10, lines 20-40) configured to receive light from the multimode doped fiber; and a monomode laser oscillator (10) configured to transmit a monomode laser beam to the first end of the multimode doped fiber. Claim 1 requires the spatial mode conversion device be a

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holographic spatial mode conversion device. Hill (column 4, lines 22-26), Szczepanek (column 5, lines 22-30), and Cunningham (column 1, lines 20-42) all teach the utilization of a holographic spatial mode conversion device. It is well known to one having ordinary skill in the art that one spatial mode conversion device can be substituted for another spatial mode conversion device. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to substitute the spatial mode conversion device of Fermann with the holographic spatial mode conversion device of Hill, Szczepanek, or Cunningham. The motivation for substituting one spatial mode conversion device for another would be to obtain desired properties, such as quick-tuning with real-time holographic effects, as is discussed in Cunningham (column 1, lines 36-42).

With respect to claims 2 and 15, Fermann teaches a core with a diameter larger than 30 micrometers (column 6, lines 18-25).

With respect to claims 5 and 7, Fermann teaches at least one pumping light source (20) configured to transmit a corresponding at least one pumping beam to the multimode fiber.

With respect to claim 8, Fermann teaches the multimode fiber comprising a plurality of doped cores (column 10, lines 39-40).

With respect to claim 13, Fermann teaches an optical cavity configured to contain the pumped-fiber laser such that the spatial mode conversion means is arranged in series with the optical cavity (figure 5).

With respect to claims 14 and 16, Fermann teaches a laser device comprising an optical cavity; a pumped-fiber laser (12 or 60) contained within the optical cavity; and a spatial mode

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conversion means (50) in series with the optical cavity, the spatial mode conversion means configured to convert a multimode beam into a monomode beam.

Response to Arguments

7. Applicant's arguments with respect to claims 1, 2, 4-8, and 12-16 have been considered but are moot in view of the new ground(s) of rejection.

Communication Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leith A Al-Nazer whose telephone number is 571-272-1938.

The examiner can normally be reached on Monday-Friday 7:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LA

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Don Wong
Supervisory Patent Examiner
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